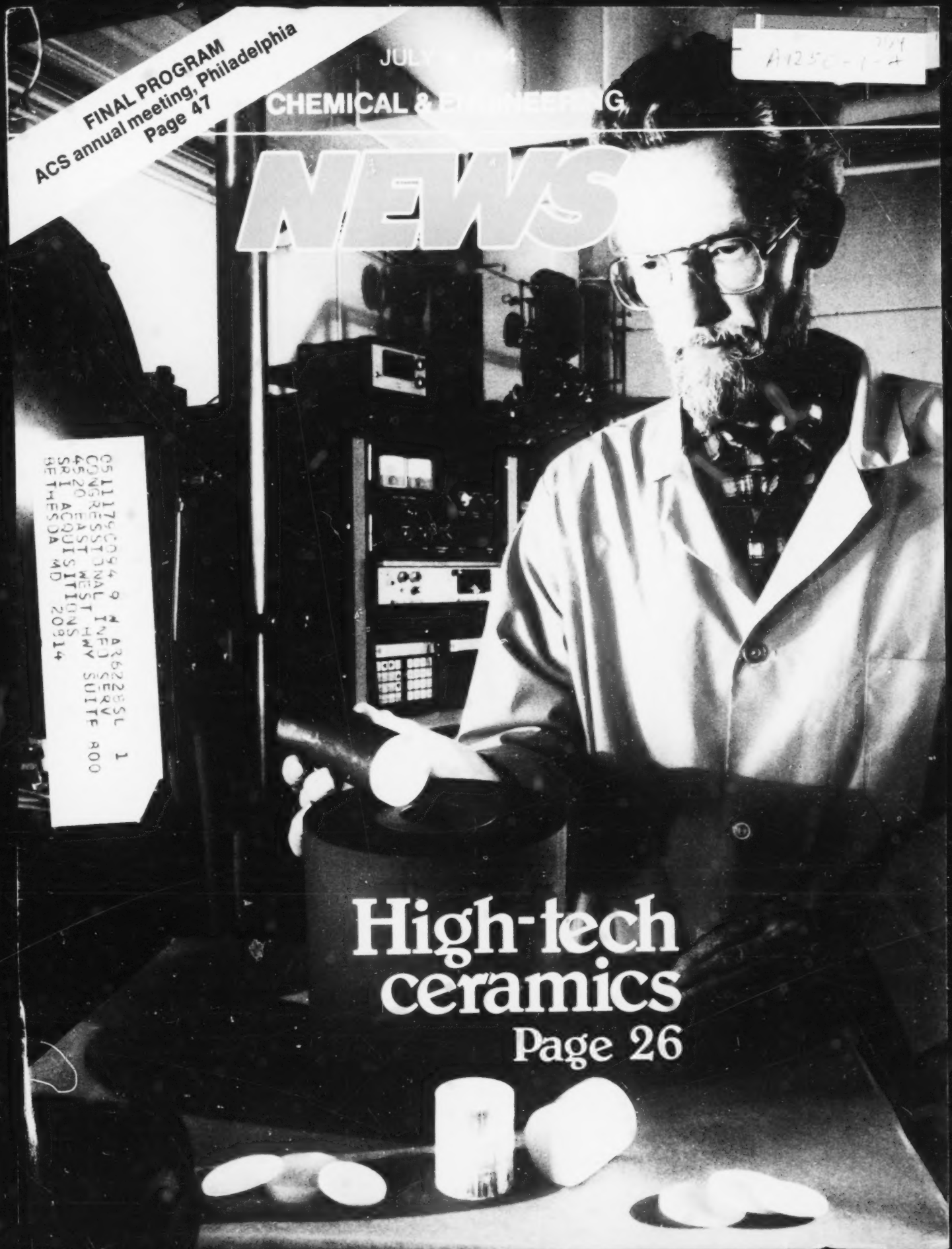
A125 C-1-2

FINAL PROGRAM
ACS annual meeting, Philadelphia
Page 47

JULY [illegible], 1984
CHEMICAL & ENGINEERING

NEWS



OS 11176C064 9 A
CONGRESSIONAL INFO SERV
4520 EAST WEST HWY SUITE 800
SRI ACQUISITIONS
BETHESDA MD 20814

AR622SSL 1

High-tech ceramics

Page 26

CHEMICAL & ENGINEERING NEWS

Volume 62, Number 28
CENEAR 62 (28) 1–132
ISSN 0009-2347

JULY 9, 1984

News of the Week

■ **Industry funding of academic research is not harmful to academic values if guidelines are followed, task force says.** **Page 6**

■ **Senate bill would provide almost $900 million over two years to improve math and science education in public schools.** **Page 7**

■ **Employment of scientists and engineers in the 1970s increased 4% per year, NSF finds.** **Page 7**

Business

Uniroyal's goal is to be a chemical producer; it will use its tire business to generate funds for expansion, acquisition. **Page 11**

International Business

Bulging capacity puts European makers of zeolites on lookout for new catalyst applications as well as renewed growth. **Page 14**

Government

Senate committee draft of TSCA revisions requires more toxicity tests for chemicals, list of those presumed hazardous. **Page 18**

Technology

Experts at conference on fire toxicity disagree on identity of the cause—flame spread, some plastics, unnamed free radical. **Page 20**

Package for data acquisition, analysis, graphics for scientific and engineering work is Macmillan Software's first product. **Page 22**

Books

"Science and Creationism," a collection of essays on creationism and evolution, is organized aimlessly by Ashley Montagu. **Page 41**

Final Program

Complete technical program, list of social events, registration and housing forms necessary for Philadelphia meeting. **Page 96**

Cover: Ceramist Carl F. Bobik of General Electric examines graphite die used to make boron nitride samples

Special Report

R&D on high-tech ceramics is increasing in the search to replace metals and plastics, but ceramics' resistance to corrosion and high temperature is offset by their brittleness. **Page 26**

Letters 4

Concentrates
Business 10
Government 16
Science/Technology 19

The Departments
People 45
Meetings 119
Newscripts 132

European Zeolite Makers Bank on Catalysts, Detergents

Companies look to renewed growth in traditional markets to soak up excess capacity, but still hope for new catalyst applications

Patricia L. Layman, C&EN London

For the European zeolites industry, there is one basic problem: It's too big. Producers anticipating good growth in markets such as desiccants and adsorbents, fluid-cracking catalysts, and detergents, have jumped into the business, building merrily away. With growth temporarily slowed, producers are sitting on abundant capacity.

To their comfort, there probably will be few newcomers jumping into the business now. Indeed, the most recent entry into the European market was Union Carbide, which bought into fluid-cracking catalysts, acquiring the Dutch-based Katalistiks, rather than building its own capacity. Producers also can take comfort in the knowledge that their business is still growing, although not so rapidly as once expected.

That is rather different than the situation in the U.S., where to be a zeolites producer might not be the happiest of circumstances. Two of the U.S. market segments, desiccants/adsorbents and fluid-cracking catalysts, are doing as well as can be hoped. However, by far the largest market—detergents—is in a shambles, following the recent decision by Procter & Gamble to reverse an earlier decision to use zeolites as builders in its detergent products.

The second largest use for zeolites in the U.S. is for fluid-cracking catalysts (FCCs), far behind the amount used for detergents (C&EN, Sept. 27, 1982, page 10). In Europe, too, FCCs probably account for the second largest use of zeolites, following detergents. Although the market for FCCs themselves is roughly the same size as that for detergent zeolites, zeolites make up only a part of a formulated FCC—anywhere from 5 to 40%. The resultant difficulty of estimating the size of the FCC zeolite market in Europe is compounded by the almost complete lack of a merchant market for the product. Probably the only company selling zeolites to FCC producers on the merchant market in Europe is Degussa, which has decided not to enter the market for formulated FCCs.

European consumption of FCCs will amount to about 40,000 metric tons this year, less than one fourth the more than 170,000 metric tons used in the U.S., and slightly less than half the amount used by the rest of the world, excluding the U.S.

But it is a promising market, and growing, as a number of catalytic cracking units have been built in Europe. Demand is increasing about 5% per year, says one marketer, who points out that the number of cracking units in the U.K. alone has doubled over the past five years. Moreover, the average catalyst use rate in Europe is about 0.15 lb per barrel of oil; in the U.S., it is slightly higher, at about 0.2 lb per bbl. That encourages European marketers, who predict that European use will begin increasing as Europe gets heavier oil stocks to begin cracking.

For the time being, however, the industry has significant overcapacity, and industry observers had feared that Union Carbide—which everyone expected to get into this segment of the business sooner or later—would build its own capacity. There was almost a collective sigh of relief throughout the industry when Carbide bought the European producer of FCCs, Katalistiks. The company's three owners—English China Clays, the Swedish firm EKA, and Baltimore-based CRI International—sold out to Carbide for a reported $45 million.

With its purchase of Katalistiks, Carbide got into the business both in Europe and in the U.S. Katalistiks started up last year a 60,000 to 80,000 metric-ton-per-year plant in Savannah, Ga., to add to its Dutch capacity. And this market is increasingly becoming internationally competitive. Besides Katalistiks' move into the U.S., Akzo is building an FCC plant in Houston, with about 45,000 tons per year of capacity, due to begin operating next year. Akzo also has just announced plans to build another FCC plant, of 25,000 metric tons capacity, in Brazil.

Zeolite producers around the world, however, are broadening the scope for their product. The development of Mobil's ZSM-5 zeolite catalyst has stimulated extensive R&D, with its capabilities of converting methanol to olefins or hydrocarbons of high octane number (C&EN, Dec. 13, 1982, page 9). And New Zealand is operating a plant to convert natural gas to synthesis gas for methanol. In addition, the West German government is sponsoring two pilot coal-gasification plants using zeolite catalysts.

Imperial Chemical Industries in the U.K. is using Mobil catalysts at its *p*-xylene plant at Wilton, in the U.K., and BASF in West Germany until earlier this year was running a pilot plant, with 50 ton-per-month capacity, using zeolite catalysts for C_1 chemistry. It has shelved the project, the company says, only because abundant oil and gas supplies

Capacity for zeolites in Europe far outstrips demand

Thousands of metric tons	Nameplate capacity	Status	1984 demand
DETERGENT-GRADE ZEOLITES	**225–260**		**120**
Degussa	75	On stream	
Henkel	70	On stream	
Crosfield/Zinkwit	30–60	Announced	
Montedison	20	Announced	
Mira Lanza	15	Announced	
Rhône-Poulenc	10	Not operating	
Akzo	10	Not operating	
FLUID-CRACKING CATALYSTS	**110**		**60[a]**
Crosfield	35	On stream	
Akzo	30	On stream	
Katalistiks (Union Carbide)	25	On stream	
W. R. Grace	20	On stream	
DESICCANTS/ ADSORBENTS	**25**		**12–15**
Union Carbide	na	na	
W. R. Grace	na	na	
Laporte	na	na	
Bayer	na	na	
CECA	na	na	
Chemische Fabrik Uetikon	na	na	
Rhône-Poulenc	na	na	

a Includes 20,000 metric tons of exports. na = not available. Sources: Industry estimates, C&EN estimates

have alleviated the economic need for continuing it.

With that kind of potential, zeolite suppliers someday could have a market that could rival synthetic detergents. But that will not happen anytime soon. Despite the problems that zeolite makers are having in penetrating the U.S. detergent market following Procter & Gamble's decision not to use zeolite builders, producers in Europe see a detergent market that is already solidly established and set to grow.

In some respects, the use of zeolites at all in detergents is surprising. Henkel researchers, for example, recall that it was difficult at first, pushing the idea of putting an insoluble material at such high concentrations into a product that must be soluble.

Zeolites were being heavily investigated in the early 1970s, with patents filed by both Henkel and Procter & Gamble in 1973. Subsequent legislation helped encourage their use.

Early on Henkel had pooled its patents and know-how in manufacturing zeolites with those of Degussa, leading to a 50-50 joint venture, Sasil Patent Verwertungsgesellschaft, to exploit detergent zeolite manufacturing technology. Henkel licenses the application in detergents; the joint venture licenses production technology.

Use of zeolites is growing slowly in those areas where legislation affects phosphates—in West Germany, Switzerland, the Netherlands, and Italy, for example. Conversely, in countries where there are no regulations limiting phosphate use, phosphates remain the builder of choice.

One of the key points comes down to cost. If zeolites can be incorporated into a product on a sound economic basis, they are attractive to soap makers. On a 100%-dry basis, zeolites cost about 37 cents per kg in Europe, and phosphates cost 55 to 63 cents per kg. However, relatively more zeolite is used for a given formulation, and transportation costs mount up quickly, a disincentive unless the detergent plant is near a source of zeolites.

As some makers of detergent zeolites scramble to modify their products, marketers of adsorbent zeolites face a much stabler, mature market. The outlet as desiccants and adsorbents is probably the oldest for zeolites. Just as in the U.S., this market is the smallest of Europe's three major markets for zeolites; but within that segment, the European breakdown differs markedly from that in the U.S. European marketers split the desiccants and adsorbents market into two parts: static adsorption, the desiccant function of zeolites in refrigerators or in double-glazing windows, for example; and dynamic adsorption, used for treating gases and liquids. In the U.S., about 80% of the market is for desiccants, with the remaining 20% going for adsorbent applications. In Europe, however, adsorbent uses predominate.

Both applications have seen hard times lately. The use of desiccants for double-glazing windows has fallen afoul of a general slowdown in construction, resulting in nearly 50% overcapacity in insulating glass manufacturing in West Germany alone—down from growth of more than 10% per year in more robust times. Suppliers of desiccants are waiting both for construction to pick up and for the inevitable replacement window market to develop.

And on the dynamic adsorption side of the business, zeolites producers have been affected by the low capacity utilization in ethylene. Not only have many ethylene plants been closed down in Europe, but those still running have been running at such low use of total capacity that the molecular sieves have been used up at a slower rate.

According to suppliers, it takes a great deal of time to develop a process to use with the appropriate zeolites. This is also difficult, in a market where "big" is probably a 5000 metric-ton-per-year plant in this specialized segment of the European industry. Carbide and Grace are vying for market leadership, although it is probably split, with Carbide the largest supplier in dynamic adsorbents and Grace the largest in the static market.

However, small markets also offer companies the ability to combine flexibility with innovation. That's the strategy suppliers such as Laporte Inorganics, Bayer, Chemische Fabrik Uetikon, Degussa, and the French firms CECA and Rhône-Poulenc are working on. □

NOTE

ONLY THE FOLLOWING PAGES OF THIS

PUBLICATION HAVE BEEN FILMED

Cov. 1, p. 3, 9-16, 19-20,

24, 29.